

## Chapter 5: Field Assessment Methods

Field assessment methods take place in the stream corridor and subwatershed, and are used to rapidly identify, design and rank potential protection and restoration projects and/or monitor improvements in stream quality. The watershed planning process relies on field assessment methods to identify and verify on stream impairments, define protection and/or restoration potential; and acquire information needed for project implementation.

While many different types of field assessment methods are presented here, the core team will most likely have to determine which methods to pursue during the scoping stage (see Chapter 4). Methods should be selected based on data gaps and available financial and technical resources. At a minimum, the core team should make sure that they have data from recent stream corridor and upland surveys. Field sheets for many of the methods described below are provided in User's Guide Tools 17 - 19. The methods described in this chapter include:

- A. Conduct Stream Corridor Assessments
- B. Conduct Upland Assessments
- C. Conduct Project Investigations
- D. Monitor Watershed Indicators

### A. Conduct Stream Corridor Assessments



Tables 5.1 and 5.2 provide a summary of some of the most commonly used stream assessment methods in Maryland. A basic stream assessment will include a semi-quantitative method that asks an investigator to assign a numeric score to various stream habitat or channel parameters by comparing what is seen at points along the stream to a series of descriptions. The numeric score is then used as a basis for classifying the stream's habitat quality (Figure 5.1). This characterization can be used in a number of ways throughout the watershed planning process by:



- Providing a current picture of stream conditions
- Monitoring stream conditions over time
- Indicating stream response to restoration projects
- Verifying certain desktop assessments outcomes such as subwatershed management classifications

Table 5.1 summarizes the stream assessments that are primarily used to score in-stream habitat.

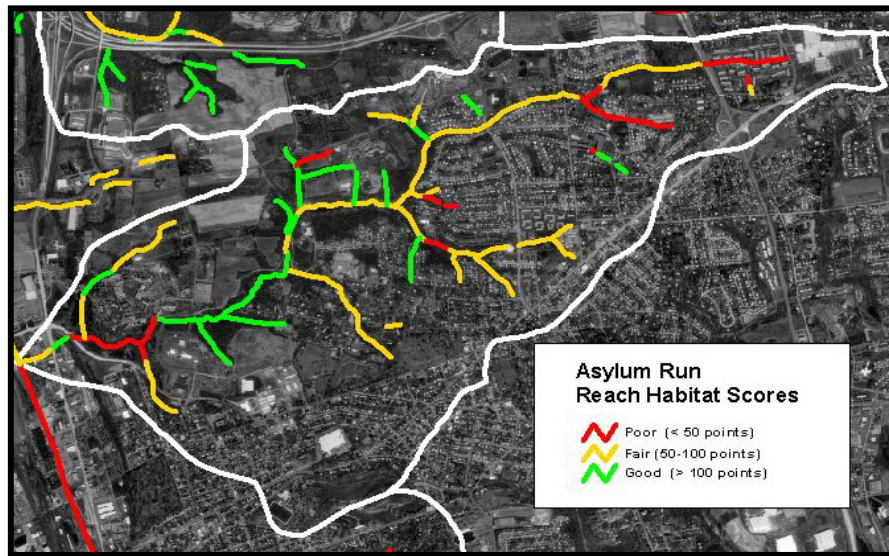


Figure 5.1: Reach Habitat Quality in Asylum Run subwatershed, Pennsylvania

Table 5.1: Comparison of In-Stream Habitat Assessment Methods			
Characteristics	RSAT <sup>1</sup>	RBP <sup>2</sup>	SVAP <sup>3</sup>
General Description	<ul style="list-style-type: none"> <li>- Evaluation of in-stream habitat</li> <li>- Developed for Montgomery County</li> <li>- Identifies channel erosion problem areas</li> <li>- Parameters measured at 400 ft intervals</li> </ul>	<ul style="list-style-type: none"> <li>- Evaluation of in-stream habitat</li> <li>- Developed by US EPA</li> <li>- Originally designed as a screening tool for determining if a stream is or is not supporting a designated aquatic life use</li> </ul>	<ul style="list-style-type: none"> <li>- Basic evaluation of in-stream habitat</li> <li>- Designed to be conducted by Soil Conservation District agents with landowner</li> </ul>
Scoring System	6 parameters, pts vary for each	10 parameters, 20 pts each	Up to 15 parameters, 10 pts each
Land Type	High gradient streams	High and low gradient streams	High gradient streams
Watershed Type	Urbanized, nontidal	Relatively natural, nontidal	Rural or agricultural, nontidal
Experience Level	Moderate	Moderate	Low
Strengths	<ul style="list-style-type: none"> <li>- User friendly</li> <li>- Can evaluate both channel conditions and macroinvertebrates</li> <li>- Tailored specifically for the Maryland Piedmont region</li> </ul>	<ul style="list-style-type: none"> <li>- User friendly</li> <li>- Rapid assessment</li> <li>- Can be integrated with bug and WQ monitoring</li> <li>- Great for volunteers</li> <li>- Can be done state-wide with little modification</li> <li>- Widely accepted and used protocol</li> </ul>	<ul style="list-style-type: none"> <li>- Designed to educate the landowner</li> <li>- Can provide landowners with ideas for improvement</li> <li>- Can pick and choose from parameters to customize to site conditions</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>- Stream drainage area should be less than 100 – 150 sq. mi.</li> <li>- Not intended for use in Coastal Plain streams</li> <li>- Frequency of intervals may be time intensive</li> </ul>	<ul style="list-style-type: none"> <li>- Minor modifications may be needed to reflect local characteristics</li> </ul>	<ul style="list-style-type: none"> <li>- Meeting with each landowner could be time intensive</li> <li>- Would require modifications for more developed areas</li> </ul>
<p>1: Rapid Stream Assessment Technique (RSAT) (Galli, 1992)</p> <p>2: Rapid Bioassessment Protocol (RBP) (Barbour <i>et al.</i> 1999); table only addresses the Habitat Assessment and Physiochemical Characterization portion of the RBP</p> <p>3: Stream Visual Assessment Protocol (SVAP) (USDA, 1998)</p>			

In addition to characterizing stream reaches, the Stream Corridor Assessment (SCA; Yetman, 2001) and the Unified Stream Assessment (USA) (Kitchell and Schueler, 2004) are continuous stream walking methods that systematically assess the range of impacts and potential protection and restoration projects found along the entire stream corridor (see Figure 5.2). Both include forms to record the severity of stream impairments (e.g., inadequate buffer and channel modification) and potential for mitigation. A summary of continuous stream walk assessment characteristics is provided in Table 5.2.

In order to devise a comprehensive picture of subwatershed conditions, the SCA or USA should be combined with an assessment of upland areas. One such technique, the Unified Subwatershed and Site Reconnaissance (Wright *et al.*, 2004) is described in the following section.

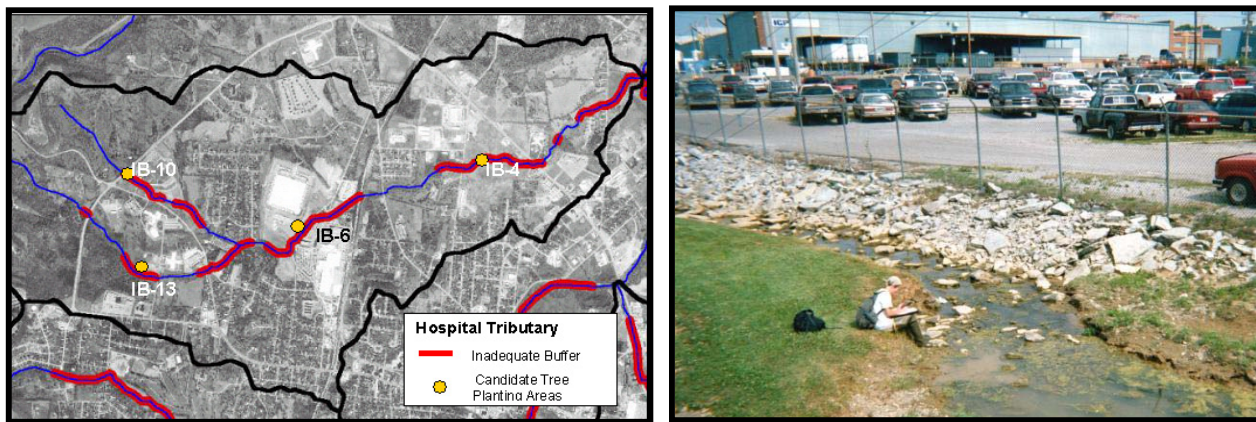


Figure 5.2: Location of impacted buffers and potential reforestation sites in Hospital Tributary subwatershed in Tennessee

Table 5.2: Summary of Continuous Stream Walk Assessment Characteristics	
Characteristics	Description
General Description	<ul style="list-style-type: none"> <li>Identifies potential projects in stream corridor</li> <li>Characterizes in-stream habitat by reach</li> </ul>
Scoring System	<ul style="list-style-type: none"> <li>Potential projects: 1-5 scale for impacts for severity, correctability, and accessibility</li> <li>In-stream habitat: 10 parameters rated as optimal, suboptimal, marginal or poor</li> </ul>
Land Type	<ul style="list-style-type: none"> <li>High-gradient and low-gradient streams</li> </ul>
Type of Watershed	<ul style="list-style-type: none"> <li>Non-tidal<sup>2</sup></li> </ul>
Experience Level	<ul style="list-style-type: none"> <li>Moderate</li> </ul>
Strengths	<ul style="list-style-type: none"> <li>Developed, tried, and tested in Maryland streams</li> <li>Identifies eight potential types of impacts for streams and records locations</li> <li>Allows for ranking of projects</li> <li>Allows for comparison of stream reaches</li> <li>Can be integrated with outfall mapping and IDDE<sup>3</sup> programs</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Require modifications for agriculturally impacted and coastal plain streams</li> <li>Can be time intensive for staff</li> <li>Requires major post processing effort</li> </ul>
1: Field sheets are provided in User's Guide Tool 17	
2: Protocols should and can be customized to address regional stream conditions and unique planning goals	

## B. Conduct Upland Assessments



Watershed-related field assessment methods typically focus on the stream corridor with less attention paid to upland areas where neighborhoods and businesses are located. However, these upland areas are important in watershed planning since they contribute stormwater pollutants to the stream corridor. The Unified Subwatershed and Site Reconnaissance (USSR) is a comprehensive survey of upland areas to identify potential pollutant sources and restoration opportunities of the watershed (see Table 5.3 and Figure 5.3). When the USA or SCA is combined with the

USSR, they generate sufficient data to devise and select which project investigations will be pursued in the next step. Field sheets for the USSR are provided in User's Guide Tool 18, and more details can be found in Wright *et al.*, 2004.

**Table 5.3: How the USSR Helps in Watershed Planning**

### Neighborhoods

- Evaluates pollutant-producing behaviors in individual neighborhoods and assigns a pollution severity index for screening purposes
- Rates each neighborhood for overall restoration potential and identifies specific restoration projects
- Examines the feasibility of on-site stormwater retrofits
- Indicates restoration projects that may require more direct municipal assistance for implementation (tree planting, storm drain stenciling, etc.)

### Hotspots

- Creates an inventory of stormwater hotspots, including regulated and non-regulated sites
- Rates the severity of each hotspot with regard to its potential to generate stormwater runoff or illicit discharges
- Suggests appropriate follow-up actions for each hotspot, including referral for immediate enforcement
- Examines the feasibility of on-site stormwater retrofits

### Pervious Areas (see Figure 5.3)

- Evaluates the current condition of natural area remnants and their potential management needs
- Determines the reforestation potential of large pervious areas

### Streets and Storm Drains

- Estimates the severity of pollutant accumulation on roads and within storm drain systems
- Assesses large parking areas for stormwater retrofit potential
- Rates the feasibility of four municipal maintenance strategies



Figure 5.3: Restoration potential of pervious areas identified during the USSR in a subwatershed of Watershed 263 in Baltimore, Maryland

## C. Conduct Project Investigations



This method involves field assessment to collect the data needed to develop workable concept designs for individual protection and restoration projects. Nine different types of project investigations can be performed with the exact number determined during the scoping phase (see Chapter 3). After potential sites are investigated in the field, site data and mapping are analyzed to create simple concept designs for each project. For more information on developing project concepts designs, see Chapter 4.

Most project investigations can be completed in a manner of a few hours or days, and are used to develop a basic concept design for each project. Most project investigations are initially identified through stream and upland assessments. Table 5.4 indicates the approximate level of effort needed to visit and assess each candidate site for each of the eight surveys. Each project investigation also requires additional analysis back in the office to work up the project concept design; the average staff time needed for each type of concept design is also provided in Table 5.4. The basic scopes of the nine project investigations are provided below and where possible field forms are provided in User's Guide Tool 19. Because of the time intensive nature of these investigations, they are typically conducted in a few select subwatersheds rather than the entire watershed. The method, "Classifying and Ranking Subwatersheds" presented in Chapter 4 may be able to help the core team identify what project investigations are appropriate for which subwatersheds.

Table 5.4: Summary of the Project Investigations			
Project Investigation	Staff Time Per Investigation		
	Unit	Project Investigation	Project Concept Design
Retrofit Reconnaissance Inventory (RRI)	Storage site	4 hrs	8 hrs
Stream Repair Inventory (SRI)	Survey reach	4 hrs	6 hrs
Urban Reforestation Site Assessment (URSA)	Planting site	2 hrs	6 hrs
Discharge Prevention Investigations (DPI)	Problem outfall	1 hr	4 hrs
Source Control Plan (SCP)	Subwatershed	20 hrs	140 hrs
Municipal Operations Analysis (MOA)	Community	8 hrs	24 hrs
Sensitive Areas Assessment	Sensitive area	Varies	N/A
Pasture Assessment for Water Resource Protection (Ladd and Frankenburger, no date)	Pasture and farm	4 hrs	Varies by project

### ***Retrofit Reconnaissance Inventory***

A retrofit reconnaissance inventory (RRI) is a rapid field assessment of potential storage and on-site retrofit sites conducted across a subwatershed. Retrofits provide stormwater treatment in locations where practices previously did not exist or were ineffective, and include modification to existing stormwater practices or construction of new practices (see Figure 5.4). The purpose of the RRI is to verify the feasibility of candidate sites and to produce an initial retrofit concept design. Typical sites that may be investigated for possible retrofitting include culverts, storm drain outfalls, highway rights-of-way, open spaces, parking lots, and existing detention ponds.

Candidate retrofit sites are identified through the SCA or USA and USSR surveys and detailed analysis of storm drain maps. RRI field forms are provided in User's Guide Tool 19.



Figure 5.4: Retrofit inventory map (left) and one retrofit example (right) in the Weems Creek watershed in Annapolis, Maryland.

### ***Stream Repair Investigation***

The problem reaches identified during the SCA or USA are used as the starting point for a Stream Repair Investigation (SRI). The SRI is used to rapidly develop concept designs for stream repair projects within defined survey reaches. Each concept provides a general sense of the type or combination of stream repair practices to be applied, along with their estimated cost and feasibility. The SRI involves a visit to the project reach to collect more stream assessment data, and work up a more detailed design sketch. Basic information is recorded on an SRI field form for each defined project reach (see User's Guide Tool 19). More information and guidance on completing the field form can be found in Schueler and Brown (2004).

### ***Urban Reforestation Site Assessment***

The purpose of an Urban Reforestation Site Assessment (URSA) is to collect data on the most promising reforestation sites in a watershed. Potential reforestation sites are identified initially through the sensitive areas analysis, and additional sites are obtained directly from the inadequate buffer data compiled as part of the SCA or USA, and the pervious area data completed during the USSR. If conducting this assessment, the Core Team should utilize the expertise of the local County forester.

Information collected during an URSA is used to select appropriate species for the site, determine the size and layout of the planting area, and develop a detailed planting plan. The URSA evaluates the following major elements at each potential reforestation site to develop an effective planting strategy: climate, topography, vegetation, soils, hydrology, potential planting conflicts, and planting and maintenance logistics. This data is then used to design reforestation projects. An URSA field form is provided in User's Guide Tool 19. More information and guidance on completing the field form can be found in Cappiella *et al.*, (2006; in press).

### ***Discharge Prevention Investigations***

A Discharge Prevention Investigation involves three phases of field assessments (see User's Guide Tool 19) to find suspect outfalls or discharges and track down and fix their specific source:

1. Find Suspect Outfalls in the Subwatershed: Two monitoring techniques can be used to isolate the problem outfalls. The first technique involves dry weather monitoring of in-stream indicators such as bacteria that signify the presence of a possible wastewater discharge. The second technique systematically inspects all outfalls in the stream network to discover flowing outfalls or evidence of past discharge events. Problem outfalls are then tested using a group of water quality indicators to determine the nature and probable source of the discharge. The SCA or USA can be used to initially screen for suspect outfalls within the stream corridor.
2. Trace Problem Back up the Storm Drain Network: The search may involve a drainage area investigation at the surface of the catchment to match the discharge to a specific business operation, or may entail an underground trunk investigation whereby strategic manholes are sampled to narrow down the probable location of the discharge source within the storm drain pipe network.

3. Isolate Specific Illicit Connections within the System: Once a discharge has been narrowed down to a specific pipe segment, the last phase isolates the problem connection through dye testing, smoke testing or video surveillance so that the discharge can be matched to a specific owner or operator. Once the connection is traced, enforcement actions are taken to fix or eliminate the discharge.

These methods are designed to find illicit discharges within the storm drain system; slightly different methods are utilized to investigate leaks, spills and overflows from the sanitary sewer system. More guidance on methods for finding and fixing illicit discharges and completing the field form can be found in Brown *et al.* (2004).

### ***Source Control Plan***

A Source Control Plan (SCP) represents the concept design for the delivery of neighborhood stewardship and hotspot pollution prevention practices. An SCP defines the focus, targets and methods to deliver source control practices within a subwatershed, and is based on the results of earlier USSR surveys. The product of the SCP is a program to target source control practices to reduce priority pollution source areas, along with a budget and delivery system to implement them. This enables non-structural source control practices to be directly compared against structural restoration practices such as retrofits and stream repairs. The 10 basic steps involved in preparing an SCP are briefly summarized below:

1. Select key pollutant of concern
2. Link pollutant to key subwatershed indicators
3. Locate specific pollutant source areas in the subwatershed
4. Identify and understand priority outreach targets
5. Develop overall source control strategy
6. Craft a clear and simple message
7. Select the most effective outreach techniques
8. Choose the mix of source control practices
9. Estimate subwatershed source control budget
10. Put together partnership to distribute practices

More guidance on the methods to prepare an SCP for a subwatershed can be found in Schueler *et al.* (2004).

### ***Municipal Operations Analysis***

A Municipal Operations Analysis (MOA) investigates opportunities in the subwatershed where municipal operations could be improved to better support watershed planning goals. While technically not a field assessment, the analysis requires visits to many local offices and municipal sites to determine the current level of practice. As many as 10 different municipal operations are inspected to evaluate whether changed practices could improve water quality, including:

1. Assessing street sweeping feasibility
2. Assessing catch basin cleanouts
3. Inspecting municipal hotspot facilities
4. Reviewing road maintenance practices
5. Reviewing employee training

6. Investigating subwatershed sewage discharges
7. Assessing pollution hotline reports and spill response
8. Identifying existing municipal stewardship services
9. Analyzing future subwatershed development
10. Inspecting existing stormwater treatment practices

More guidance on conducting the MOA can be found in Schueler and Kitchell (2005).

### ***Sensitive Areas Assessments***

The purpose of sensitive area assessments is to generate a list of priority areas for land conservation. Potential assessment areas are initially identified through the sensitive areas inventory outlined in Chapter 4. Field data gathered from the assessments, combined with vulnerability to future development should dictate each sensitive area's prioritization for conservation (see Figure 5.5). Many assessments are available that evaluate the quality of each area. A select few are discussed below.

#### **Contiguous Forest Assessment**

According to MD DNR, contiguous forest, also referred to as potential Forest Interior Dwelling Species (FIDS) habitat, is defined as "a forest tract that meets either of the following conditions: a) greater than 50 acres in size and containing at least 10 acres of forest interior habitat (forest greater than 300 feet from the nearest forest edge) or b) riparian forests that are, on average, at least 300 feet in total width and greater than 50 acres in total forest area."

Initial screening of field candidate tracts should be determined using the sensitive areas inventory (see Chapter 4). Field assessments should be performed at randomly selected sites along a pre-determined tract transect. For a tract less than 100 acres, three points per tract are usually enough; larger tracts may warrant additional sampling points. Each site should be evaluated in the field by assessing forest community, structure and canopy. The field assessment also verifies forest contiguity by looking for roads, clearing or recent development. Other factors evaluated in the assessment include forest structure, understory conditions, invasive species, and diseases. A contiguous forest field data sheet is provided in User's Guide Tool 19.

#### **Rare, Threatened and Endangered Species Assessment**

Habitat is the key factor while trying to locate and protect Rare, Threatened and Endangered species (RTE). RTE species are commonly reduced to that status due to reduced or negatively impacted habitat in the past. Prior to conducting a field assessment of RTE habitat, the core team should contact MD DNR to obtain existing data and then identify these habitats through the sensitive areas inventory presented in Chapter 4. At a minimum, the field assessment should survey the site to assess population status and potential threats to their health (e.g., the presence of invasive species or development). A rare, threatened and endangered species field data sheet is provided in User's Guide Tool 19.

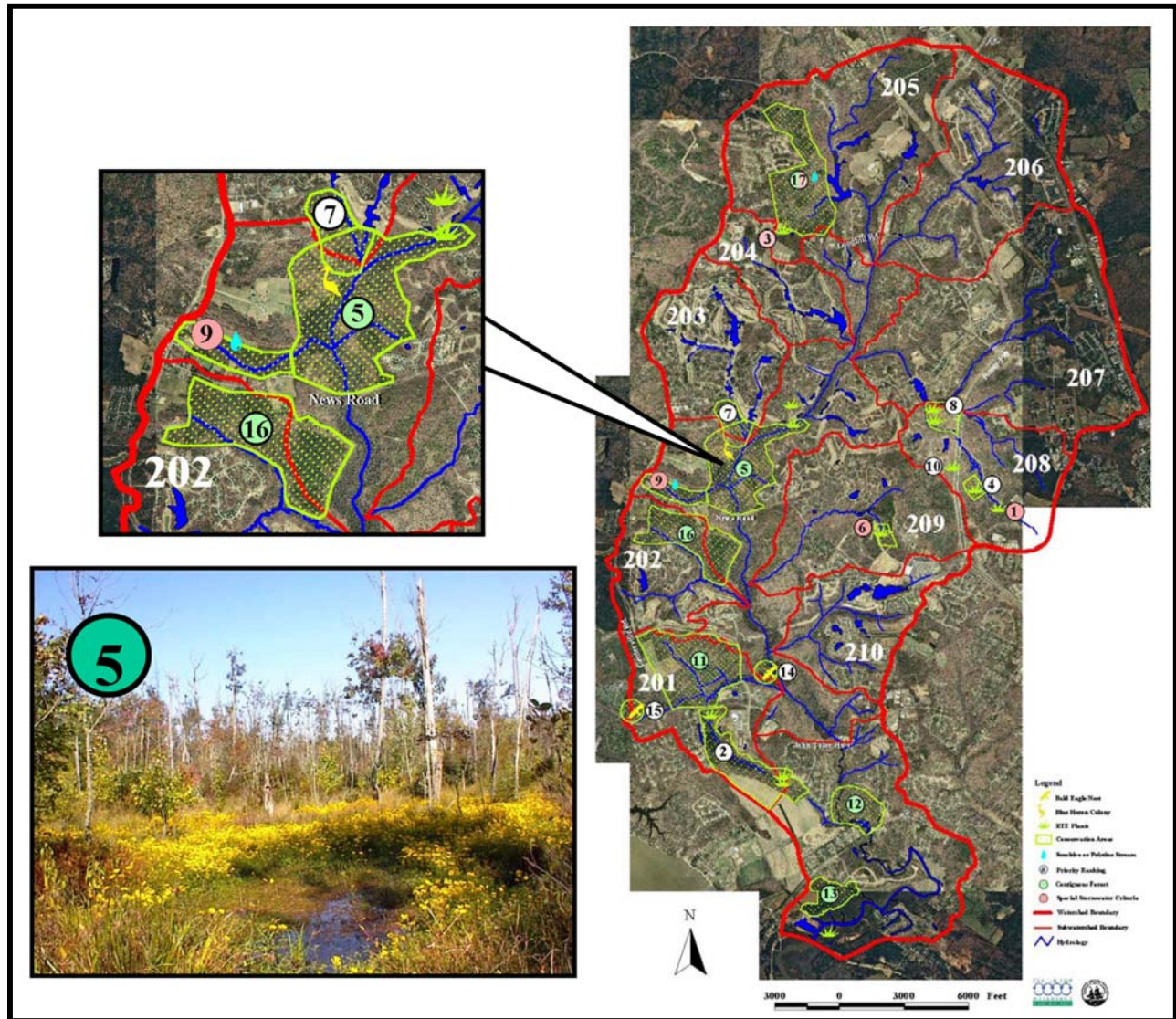


Figure 5.5: Sensitive areas assessment for Powhatan Creek watershed, Virginia

### Wetland Assessment

The purpose of a wetland assessment is to evaluate potential wetland protection and restoration sites identified through the sensitive areas inventory (Chapter 4) to verify their existence and type, and assess their condition, functional capacity, and restorability. Wetland condition refers to the degree to which the wetland has been impacted by surrounding land use and other activities, while wetland functional capacity refers to the capacity of a wetland to perform specific functions, such as provide wildlife habitat, water quality treatment, or flood control. More than 90 wetland assessment protocols exist to evaluate wetland function and/or condition. Guidance on selecting a method appropriate for the wetland type(s), purpose, region, and parameters of interest is provided by Bartoldus (2000), Kusler (2003), and MDE (1997a). A Maryland-specific method called A Method for the Assessment of Wetland Functions (MDE, 1997a; Fugro East, 1995) was developed by MDE for the evaluation of non-tidal palustrine

vegetated wetlands. This method is used for inventory or planning purposes, and evaluates hydrology, water quality, and habitat functions.

Some wetland assessment protocols also evaluate the restorability of a site. Wetland restoration modifies the site hydrology, elevation, soils, or plant community to enhance the functions of a degraded wetland or a former wetland. Potential wetland restoration sites identified during the sensitive areas analysis can be evaluated during a wetland assessment to determine restoration feasibility. This includes looking at whether the proposed project is compatible with surrounding land use, determining the extent of modifications to elevation and hydrology, and determining if a nearby seed source is available.

### ***Pasture Assessment for Water Resource Protection***

This pasture assessment (Ladd and Frankenburger, ND) is used to locate potential water quality degradation areas of farms and create an action plan to help remediate the problems. Areas of concern are identified using the “Quick Check” assessment, which covers well protection; grazing, forage, stream, ditch, and wetlands management; nutrient management; and soil conservation. The assessment also includes an Action Plan form which utilizes information from the worksheet to provide recommendations to address the areas of concern. Various references are provided to help design solutions for problem areas. Project concept designs will vary based on the problem(s) found and may include well testing, grazing management, erosion control, cattle exclusion fencing, stream buffer plantings, pasture monitoring, or pollution control. Completing an action plan and recording actions can help farmers create a record of their efforts to protect water quality. This assessment is available online at: [www.ecn.purdue.edu/SafeWater/farmasyst/surveys/WQ-39.pdf](http://www.ecn.purdue.edu/SafeWater/farmasyst/surveys/WQ-39.pdf).

Core teams conducting a watershed plans which include an agricultural project investigation component should contact and/or include the local Soil Conservation District for additional resources, expertise and assessments.

## **D. Plan for Indicator Monitoring**



As part of the watershed planning process, the core team should map out a plan for measuring success through indicator monitoring. A good monitoring plan should include sentinel monitors, which are fixed, long-term stations that measure long-term trends in selected aquatic indicators over five to ten years. Sentinel monitors measure key biological, physical, habitat or water quality indicators in stream health. (e.g., State’s water quality monitoring stations and MD DNR’s

Maryland Biological Stream Survey stations). Trend monitoring is the best way to determine if stream conditions are improving, watershed goals are being met, and progress towards TMDL implementation is being made. A monitoring plan consists of four basic tasks:

1. *Identify the right stream quality indicators:* Any indicators measured at sentinel monitoring stations should be directly linked to watershed goals. In addition, the core team should choose indicators that are repeatable, sensitive,

Where possible, the core team should plan to install sentinel monitors at the onset of watershed implementation and tie-in with existing state monitoring stations.

discrete, and relatively inexpensive. Obviously, not all indicators can meet all four of these selection criteria. Table 5.5 summarizes the range of potential indicators that can be used for sentinel monitoring, and compares how well they meet the four indicator selection criteria. The State of Maryland has also developed a set of environmental indicators that are available at [www.mde.state.md.us/aboutmde/reports/indicators.asp](http://www.mde.state.md.us/aboutmde/reports/indicators.asp). These indicators should be used wherever possible for consistency.

Table 5.5: Examples of Sentinel Indicators to Measure Progress Toward Goals		
Indicator	Indicator Strength	Potential Source of Information*
<i>Dry Weather Water Quality</i>		
Fecal coliform (or other pathogen indicator)	●	CBP, MD DNR
Nutrients (nitrogen or phosphorus concentrations)	●	EPA, MD DNR
Algal growth (Chlorophyll a or plankton)	⊙	CBP
Dissolved oxygen	⊙	MD DNR
Chemical concentrations (pesticides, metals, etc.)	○	CBP
Chemical concentrations in sediment (pesticides, metals, etc.)	○	CBP, USGS
Total Suspended Solids	⊙	CBP, EPA, MD DNR
Water clarity (turbidity)	⊙	CBP
<i>Biological</i>		
Fish diversity (F-IBI)	●	MD DNR
Aquatic insect diversity (B-IBI)	●	MD DNR
Single indicator species (e.g., striped bass, blue crab, shellfish)	●	MD DNR
Spawning or migration success	⊙	MD DNR
Submerged Aquatic Vegetation (SAV) Coverage	⊙	CBP
Riparian plant diversity	⊙	CBP
Finfish/shellfish contaminant monitoring (metals and pesticides)	○	MDE, MD DNR
<i>Physical and Hydrologic</i>		
Stream habitat index (RBP or RSAT)	●	MD DNR
Riparian habitat index	⊙	MD DNR
Channel/Bank stability (in Physical Habitat Index or SCA)	⊙	MD DNR
Summer stream temperature	⊙	CBP, MD DNR
Average summer baseflow	○	USGS
<i>Community</i>		
Trash and debris levels during annual cleanup	●	
Recreational use	⊙	
Public access	●	
Citizen attitudes toward streams	⊙	
Key ● = Excellent indicator, meets all of the selection criteria ⊙ = Decent indicator, meets 2 or 3 of the selection criteria ○ = Specialized indicator, meets only one selection criteria * Resources presented here were selected from Tier 1 of the Monitoring Resources in User's Guide Tool 3. CBP = Chesapeake Bay Program; MD DNR = MD Department of Natural Resources; EPA = U.S. Environmental Protection Agency; USGS = United States Geological Survey.		

2. *Locate representative fixed monitoring stations:* At least one fixed sampling station should be located in every subwatershed. Ideally, each station should be established in the same basic location in the subwatershed (e.g., below the most downstream road crossing). Care should be taken to ensure that each station represents stream conditions for the subwatershed as a whole and is not unduly influenced by local factors such as outfalls or pollution discharges.
3. *Create a schedule for annual sampling across all subwatersheds:* The sampling schedule at a sentinel station is determined by the aquatic indicators selected. In most cases, sampling will be scheduled during a common “window” every year at the sentinel station – the same time of day during the same season and under the same flow conditions.
4. *Set up a tracking system to analyze indicator data for long-term trends:* The last consideration in setting up a long-term monitoring plan is setting up a tracking system in anticipation that indicator data will be entered and analyzed from year-to-year. The analysis conducted on this data should be used to track watershed improvement.

